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The Genus Pachydactylus
(Part 1)

SUMMARY

The range of variation in topotypical material of **Pachydactylus serval** is presented and the conclusion drawn is that **P. purcelli** and **P. onscepensis** should be regarded as races of **P. serval**. The relationship of **P. serval** to **P. weberi** is also discussed.

INTRODUCTION

South African forms of the genus Pachydactylus have caused a great deal of taxonomic difficulty, more perhaps than any other vertebrate group, and the purpose of this series of papers is to attempt some clarification, based on the extensive series of geckoes of this genus collected by the Port Elizabeth Museum.

This first paper deals solely with the difficult group of depressed, rupicolous geckoes of the west coast, as far north as Helmeringhausen. The forms occurring further north will be dealt with in subsequent papers.

The species under discussion are all strongly depressed, rupicolous forms living in narrow crevices in hard rocks such as granites, sandstones, quartzites, vein quartz, dolerites and various lavas. They are often very localised in distribution and when collecting in the field the writers found that, if no geckoes or eggs are seen within twenty minutes or so, it is better to move on to another locality. Where they occur they are often common and a dozen may be collected in a short space of time. Being strictly nocturnal and remaining deep in crevices during the day, it is not surprising that the first species was not described until 1907, being overlooked even by such eagle-eyed collectors as Andrew Smith. When disturbed they are quick and extremely agile, particularly at night, when they are even more difficult to catch than during the day.

The geckoes to be dealt with here were originally described as the following species and sub-species:

	1. **Pachydactylus weberi** Roux 1907
weberi group	2. **Pachydactylus capensis gariesensis** Hewitt 1932
	3. **Pachydactylus weberi acuminatus** FitzSimons 1941

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4. **Pachydactylus serval** Werner 1910
serval group 5. **Pachydactylus purcelli** Boulenger 1910
6. **Pachydactylus montanus** Methuen & Hewitt 1914
7. **Pachydactylus montanus onscepensis** Hewitt 1935

Since publication of the original descriptions listed above, there have been three important reviews and summaries of the taxonomic position: FitzSimons (1943), Loveridge (1947) and Mertens (1955). Mertens' paper only covers South West Africa so that he does not deal with the southern races of **weberi**.

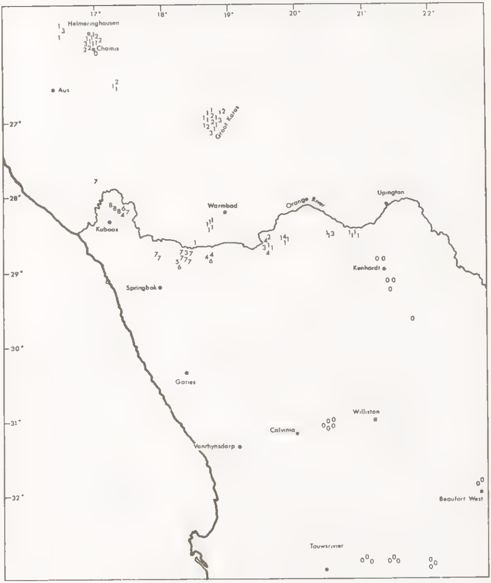
The classifications suggested by these three writers are as follows:

FitzSimons (1943)	Loveridge (1947)	Mertens (1955)
P. weberi weberi	**P. weberi weberi**	-
w. gariesensis	**w. gariesensis**	-
w. acuminatus	**w. acuminatus**	**w. acuminatus**
	. . . .	
P. serval	**P. serval**	**P. serval**
purcelli	**purcelli**	**purcelli**
montanus montanus	**= serval**	**= serval**
m. onscepensis	**= serval**	**= serval**

At first glance the above table appears to show fairly close agreement, both Loveridge and Mertens agreeing that only three **species** are involved and that **montanus** and **onscepensis** are synonymous with **serval**. Furthermore in a footnote, Loveridge quotes FitzSimons as agreeing re **onscepensis** and states: "As FitzSimons remarked that the Seeheim gecko was without tubercles, it seemed possible that it was a P. **purcelli**. In replying to this suggestion, however, FitzSimons (1.II.44) assures me that in all other respects this young gecko is inseparable from **P.m. onscepensis** i.e. **purcelli** (sic) as here understood, a synonymizing of **onscepensis** with which Dr. FitzSimons concurs". However, in the main text Loveridge synonymizes **P.m. onscepensis** with **serval** (not purcelli as stated in the footnote) so presumably he meant that FitzSimons agrees that **P.m. onscepensis** is synonymous with **serval**. However, this still leaves the status of **purcelli** in relation to the others undecided.

The main criteria used by the above writers for separating the various forms are the degree of heterogeneity in the dorsal scaling and the nasal characters. In the **weberi** group the rostral does not enter the nostril; in the **serval** group it does.

As **P. serval** was the first species (in the serval group) to be described, by Werner in 1910, the writers' first tasks were to examine the type and collect topotypical material to establish the range of variation in this species. Fortunately, Mr. R. Liversidge of this Museum happened to be going to East Berlin and kindly examined the type for us. He reported **inter alia** that the rostral



MAP SHOWING GEOGRAPHICAL DISTRIBUTION AND $\frac{\text{PER CENT}}{10}$ TUBERCULATION OF P SERVAL AND RELATED FORMS and first upper labial enter the nostril and that the dorsal scaling was homogeneous and lacked tubercles.

FitzSimons (1943), when discussing the status of **P. serval** remarked, "There are apparently no specimens of this species in the South African Museums, and it would appear to be of rare occurrence".

To collect topotypical material the writers visited the type-locality, Chamis (Great Namaqualand) just south of Helmeringhausen. This farm has been divided and the northern half, on which the old homestead still stands is now known as Mooifontein. The southern half is Chamis Süd. Diligent search in the neighbourhood of the homestead (based on the assumption that the original collector was staying there) failed to reveal any geckoes but the rock is unsuitable, being massive dolomites of the Nama System, the cracks and joints full of fine dust which apparently rendered them unacceptable to geckoes. However, about 2 miles north of the homestead a small quartz vein yielded 2 specimens while 5 miles north of the house, another 10 were extracted from a similar but larger quartz vein.

This topotypical material agrees with the type as far as the nasal characters are concerned; in all cases the rostral enters the nostril. As far as the dorsal scaling is concerned, the 12 specimens are variable. The extent of this variation is shown in Table 1. The actual size of the ground scales and of the dorsal tubercles was measured in each specimen and the approximate percentage of the body (between the limbs) which is covered by tubercles was estimated. As may be seen from Table 1, the size of the ground scales varies from 8 to 10* in the adult specimens. The size of the enlarged tubercles being in the range 14 to 18 (excluding No. 1494/35 which is only sub-adult) and the percentage of tubercles present varies from 0 (as in the type) to 30%. The average cover being about 15%. It should be stated immediately that these percentage figures are no more than estimations, as it is very difficult to give precise measurements of the degree of tuberculation of the dorsal surface. One complication is that some specimens have enlarged ground scales which are not keeled and are therefore not treated as tubercles in Table 1. The percentage figures refer to keeled tubercles and are intended as a rough guide to the rugosity of the dorsal scaling. When tubercles cover 40% or more of the back, they tend to form distinct longitudinal rows.

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* One unit = one fortieth of a millimetre.

TABLE 1

PERCENTAGE OF DORSAL SURFACE COVERED IN TUBERCLES; LENGTH OF HEAD AND BODY; SIZE OF TUBERCLES AND SIZE OF GROUND SCALES

	% tuberculation of dorsal surface		Length Head & Body	Average size of 10 tubercles	Average size ground scales
1494/35	Chamis	20% (2)	3.1 cms.	10.4	6.5
1494/36	Chamis	10" (1)	3.5 "	14.3	8.1
1494/37	5m. N. Chamis	10" (1)	3.7 "	15.4	10.8
1494/38	"	30" (3)	3.0 "	15.0	7.8
1494/39	"	20" (2)	3.8 "	18.2	9.8
1494/40	"	10" (1)	4.0 "	16.5	10.0
1494/41	"	20" (2)	3.8 "	14.8	9.1
1494/42	"	10" (1)	3.9 "	15.9	9.0
1494/43	"	20" (2)	3.5 "	17.3	9.1
1494/44	"	0" (0)	2.5 "	-	8.1
1494/45	"	10" (1)	4.0 "	15.3	8.9
1494/46	"	10" (1)	3.0 "	16.0	7.9

With this topotypical material available it is possible to compare geckoes of the **serval** group occurring over the whole area from Touws River in the south to Chamis and Barby in the north. Throughout this range, the nasal character (rostral entering the nostril) was accepted as the main distinguishing feature of members of the **serval** group as opposed to those of the **weberi** group. Coloration too is remarkably constant and even specimens of purcelli from the southern Karoo are very similar to examples of **serval** from Chamis. On the other hand the degree of tuberculation of the dorsal surface is extremely variable. On Map 1, an attempt has been made to plot this variation geographically. Each number represents the percentage (divided by 10) of the dorsal surface of each specimen estimated to be covered in tubercles. Thus a figure 3 indicates that 30% of the dorsal surface, between the fore and hind limbs is covered with tubercles.

It will be noted that specimens from Touws River, Beaufort West, between Williston and Calvinia and from an area stretching as an arc northwards through Kenhardt and Warmbad to Konkiep, Chamis and Barby, are all characterised by almost homogeneous dorsal scaling. There is, however, a distinct increase in tubercles in specimens from north of Warmbad. The greatest increase of all, however, occurs along the lower Orange River from East to West. In Fig. 1, the degree of tuberculation of the specimens collected along the south bank of the river is plotted against mileage along the river, from Kakamas in the East to the Tatasberg region of the Richtersveld in the West. It will be seen that specimens

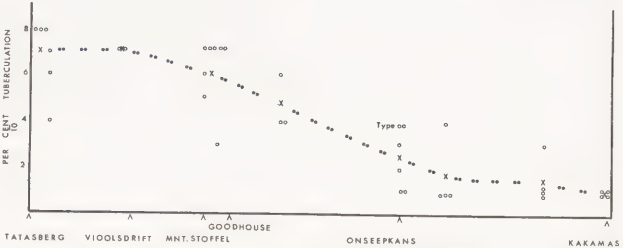

Figure 1

Graph showing increase in tuberculation from East to West along Orange River. o = specimen, X = average.

from Kakamas have little or no dorsal tuberculation and approach purcelli in this respect but as one moves west the number of tubercles present increases until in the Richtersveld the dorsal scaling approaches that found in **P. weberi**. Furthermore in two specimens from the Obib Hills, caught on the same outcrop of rock, one has the rostral entering the nostril and the other does not. This nasal character and the absence of large tubercles on the hind limbs serve to distinguish members of the **serval** group from **weberi** even when, as in this case, the two occur together.

Within the serval group, it seems clear that only one **species** is involved. Specimens of **purcelli** from the southern Karoo are extremely close to some of the topotypical material from Chamis. Furthermore the range of variation of **serval** is sufficient to cover most specimens over the whole area except those along the Orange River (which are too rugose) and those from the Karoo which are too homogeneous dorsally. **Pachydactylus purcelli** is therefore considered to be a southern race of **serval** while the name **onscepensis** is available for the forms along the lower Orange River from Onseepkans to the Richtersveld. The type of **onscepensis** was examined and would be rated by the writers as having about 40% of the dorsal surface covered with tubercles. The nominate race would cover specimens north of the Orange River away from the valley itself. **P. montanus** is considered synonymous with **serval**.

It is interesting to speculate on the reasons for the great increase in tubercles found in specimens from the Orange River valley. It will be noted from Map 1 that it is only when the river drops below the Aughrabies falls into the relatively low-lying gorges that the increase in tubercles begins. The specimens from south-west of Warmbad are interesting in this connection. They are almost devoid of tubercles but were collected at a height of 1200 metres whereas the river nearby is only 300 metres above sea level. Furthermore Goodhouse has the unenviable reputation of being the hottest place is South Africa and the official gross annual evaporation figures for three stations along the lower Orange River are as follows: Vioolsdrift 104, Kakamas 110 and Buchuberg 100. Away from the river they are much lower: Sakrivier 81, Brandvlei 69 and Carnarvon 92. The increased incidence of tubercles appear to be a reaction to the extremely high temperatures coupled with high aridity. It will be noticed that Kakamas has a high evaporation figure but the geckoes there are not strongly tuberculated. Temperatures at Kakamas, though high are probably not as high as along the gorges of the lower river; unfortunately comprehensive figures are not available.

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